

1946 Aleutian tsunami field survey in the Marquesas

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Abstract. We have mapped the run-up and inundation of the 1946 tsunami in 29 valleys on all six populated Marquesas Islands. Given the age of the event, the only measurable physical evidence consists of coral blocks carried inland by the wave, found at only three locations, Hanamenu (Hiva Oa), Hanahouua (Ua Huka) and Hooumi (Nuku Hiva), with one block estimated at 12 tons deposited 250 m inland. We also conducted interviews of 42 eyewitnesses (aged 59 to 89; only one was unreliable and discarded), followed by a survey of the inundation as identified by the witness, resulting in a dataset of 47 inundation points, with locations compiled from GPS, and run-up heights measured using leveling techniques. Most overland run-up ranged between 5 and 8 m, with values inside river beds amplified by a factor of 2 to 2.5. Inundation distances varied with the individual valley, reaching 1.2 km at Taipivai (Nuku Hiva). The lowest run-up (2.5 m) was measured in the flat, wide-open valleys of Taipivai and Hooumi (Nuku Hiva), corresponding to maximum inundation. The highest overland run-up (14.6 m at Tahauku, Hiva Oa; site of the only 2 casualties) was also measured far from shore (800 m); in the narrow valleys of Ua Pou, river-bed run-up reached 20 m. This database will be interpreted by modeling the response of the individual bays. We also examined the location of schools and hospitals, in the wake of the damage inflicted to the school at Omoa (Fatu Hiva) in 1999 by a mini-tsunami from a nearby aerial rockslide. Unfortunately, half of the schools are on the seafront, inside the zone of destruction of the 1946 tsunami. We recommend that such structures be moved to safer locations inland.

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